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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,367	01/25/2002	Anthony E.G. Cass	620-183	7631

23117 7590 12/20/2004

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EXAMINER	
FORMAN, BETTY J	

ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 12/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,367	CASS, ANTHONY E.G.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 October 2004*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-13,15-20 and 22-50* is/are pending in the application.

4a) Of the above claim(s) *32-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10,15-20 and 22-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 October 2004 has been entered.

Status of the Claims

2. This action is in response to papers filed 13 October 2004 in which claims 10-12 15-17, 22-24 and 31 were amended, claim 14 was canceled. The amendments have been thoroughly reviewed and entered.

The previous objections and rejections under 35 U.S.C. 112, second paragraph in the Office Action dated 13 May 2004 are withdrawn in view of the amendments. The previous rejections under 35 U.S.C. 102(e) and 35 U.S.C. 103(a) are maintained as reiterated below. Applicant's arguments have been thoroughly reviewed and are discussed below. New grounds for rejection are discussed.

Claims 1-8, 10-13, 15-20, 22-31 are under prosecution.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 10, 13, 20, 25-26, 28-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Reed et al (U.S. Patent No. 6,492,143, filed 17 December 1998).

Regarding Claim 1, Reed et al disclose a detector array comprising one or more groups of broad specificity biological sensing elements and variants thereof discretely immobilized onto a solid support ("arrayed in microtiter plates", Column 34, lines 62-65) wherein the sensing element is a polypeptide fragment comprising a ligand binding site (Column 33, lines 27) wherein the sensing elements have attached thereto a detectable label (e.g. rhodopsin-tagged protein, Column 33, lines 4-48 and Column 16, lines 16-54) and (Column 32, line 50-Column 34, line 3).

Regarding Claim 2, Reed et al disclose the detector wherein there is at least one group (Column 34, lines 58-67).

Regarding Claim 3, Reed et al disclose the detector wherein there are from 2 to 50 groups (Column 34, lines 58-67).

Regarding Claim 4, Reed et al disclose the detector wherein the group consists of a biological sensing element and from 1 to 100 variants (Column 34, lines 58-67).

Regarding Claim 5, Reed et al disclose the detector wherein the group consists of a biological sensing element and from 5 to 25 variants (Column 34, lines 58-67).

Regarding Claim 10, Reed et al disclose the detector wherein the ligand binding site contains one or more cysteine residues (Example 1, e.g. Column 23, lines 5-11 and 39-44, Column 24, lines 5-9 and 38-42).

Regarding Claim 13, Reed et al disclose the detector wherein a variant is derived from a sensing element (i.e. odorant-binding protein) and differ is binding specificity (Column 34, line 58-Column 35, line 45).

Regarding Claim 20, Reed et al disclose the detector wherein the label is susceptible to change upon ligand binding i.e. Ca^{+2} dependent signal is detected (Column 33, line 28-Column 34, line 3).

Regarding Claim 25, Reed et al disclose the detector wherein the label is a fluorophore i.e. FITC-coupled antibody probing rhodopsin (Column 33, line 4-20).

Regarding Claim 26, Reed et al disclose the detector wherein the label is a labeled probe i.e. FITC-coupled antibody probing rhodopsin (Column 33, line 4-20).

Regarding Claim 28, Reed et al disclose the detector wherein the sensing element is an odorant binding protein from a mammalian organ (Abstract).

Regarding Claim 29, Reed et al disclose the detector wherein the sensing element is a mammalian binding protein (Column 8, lines 52-55 and Example 1, Column 22, lines 15-17).

Regarding Claim 30, Reed et al disclose the detector wherein the sensing element is a human odorant binding protein (Column 8, lines 52-55).

Regarding Claim 31, Reed et al disclose a detector array comprising a plurality of discrete biological sensing elements immobilized onto a solid support wherein each sensing element has a ligand binding site capable of binding a broad range of structurally diverse ligands, the sensing element are provided in groups, each comprising at least one variant differing ligand binding from the element from which it was derived (Column 34, line 56-Column 35, line 45) and each sensing element and variant having a detectable label attached wherein the physical characteristics of the label being susceptible to change upon ligand binding i.e. Ca^{+2} dependent signal is detected (Column 33, line 28-Column 34, line 3).

5. Claims 1-5, 13, 15, 20, 25-26, 28, 29 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Krautwurst et al (Cell, December 1998, 95: 917-925).

Regarding Claim 1, Krautwurst et al disclose a detector array comprising one or more groups of broad specificity biological sensing elements and variants thereof discretely immobilized onto a solid support ("arrayed in microtiter plates", page 919, last paragraph) wherein the sensing element is a polypeptide fragment comprising a ligand binding site wherein the sensing elements have attached thereto a detectable label (e.g. rhodopsin-tagged protein, Fig. 1, page 919).

Regarding Claim 2, Krautwurst et al disclose the detector wherein there is at least one group i.e. ten groups of eight constructs (page 919, last paragraph).

Regarding Claim 3, Krautwurst et al disclose the detector wherein there are from 2 to 50 groups i.e. ten groups of eight constructs (page 919, last paragraph).

Regarding Claim 4, Krautwurst et al disclose the detector wherein the group consists of a biological sensing element and from 1 to 100 variants i.e. ten groups of eight constructs (page 919, last paragraph).

Regarding Claim 5, Krautwurst et al disclose the detector wherein the group consists of a biological sensing element and from 5 to 25 variants i.e. ten groups of eight constructs (page 919, last paragraph).

Regarding Claim 13, Krautwurst et al disclose the detector wherein a variant is derived from a sensing element (i.e. olfactory receptor) and differ is binding specificity (e.g. Fig. 3-6).

Regarding Claim 15, Krautwurst et al disclose the detector wherein the variant contains from 1 to 5 amino acid differences from the sensing element (e.g. Fig. 6 and legend).

Regarding Claim 20, Krautwurst et al disclose the detector wherein the label is susceptible to change upon ligand binding i.e. Ca^{+2} dependent signal is detected (page 918, last paragraph-page 919, left column).

Regarding Claim 25, Krautwurst et al disclose the detector wherein the label is a fluorophore i.e. FITC-coupled antibody probing rhodopsin (page 925, first full paragraph).

Regarding Claim 26, Krautwurst et al disclose the detector wherein the label is a labeled probe i.e. FITC-coupled antibody probing rhodopsin (page 925, first full paragraph).

Regarding Claim 28, Krautwurst et al disclose the detector wherein the sensing element is an odorant binding protein from a mammalian organ (Abstract).

Regarding Claim 29, Krautwurst et al disclose the detector wherein the sensing element is a mammalian binding protein (Abstract).

Regarding Claim 31, Krautwurst et al disclose a detector array comprising a plurality of discrete biological sensing elements immobilized onto a solid support wherein each sensing element has a ligand binding site capable of binding a broad range of structurally diverse ligands, the sensing element are provided in groups, each comprising at least one variant differing ligand binding from the element from which it was derived and each sensing element and variant having a detectable label attached wherein the physical characteristics of the label being susceptible to change upon ligand binding i.e. Ca^{+2} dependent signal is detected (page 918, last paragraph, through page 919).

6. Claims 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Reed et al (U.S. Patent No. 6,492,143, filed 17 December 1998) as defined by Dal Monte et al (Chemical Senses, 1993, 18(6): 713-721).

Regarding Claims 6-8, Reed et al disclose a detector array comprising one or more groups of broad specificity biological sensing elements and variants thereof discretely immobilized onto a solid support ("arrayed in microtiter plates", Column 34, lines 62-65)

wherein the sensing element is a polypeptide fragment comprising a ligand binding site (Column 33, lines 27) wherein the sensing elements have attached thereto a detectable label (e.g. rhodopsin-tagged protein, Column 33, lines 4-48 and Column 16, lines 16-54) and (Column 32, line 50-Column 34, line 3)wherein the sensing elements are human odorant-binding proteins (Column 8, lines 52-67) which Dal Monte et al define as being less than 50kDa (Abstract).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 11-12, 15-19 and 22-24are rejected under 35 U.S.C. 103(a) as being unpatentable over by Reed et al (U.S. Patent No. 6,492,143, filed 17 December 1998) in view of Hoffman et al (U.S. Patent No. 5,998,588, filed 30 August 1996).

Regarding Claims 11-12, 15-19 and 22-24, disclose a detector array comprising one or more groups of broad specificity biological sensing elements and variants thereof discretely immobilized onto a solid support ("arrayed in microtiter plates", Column 34, lines 62-65) wherein the sensing element is a polypeptide fragment comprising a ligand binding site (Column 33, lines 27) wherein the sensing elements have attached thereto a detectable label (e.g. rhodopsin-tagged protein, Column 33, lines 4-48 and Column 16, lines 16-54) and (Column 32, line 50-Column 34, line 3). Reed et al do not teach the ligand binding site is modified to contain cysteine residues or the variants contain from 1 to 5 or 2 to 4 points of

difference from the element from which they were derived and which affects binding specificity. However, Hoffman et al teach a similar detector array wherein biological sensing elements are immobilized onto a solid support and have a label attached thereto wherein variants of the sensing elements being modified to contain cysteine residues and having between 2 to 4 amino acids difference binding elements wherein the differences affect binding specificity (Column 16, lines 10-58) wherein the label is attached to a cysteine residue within the binding site or at different amino acid positions within the binding site (Column 11, line 61-Column 12, line 32; Column 16, lines 48-58 and Column 16, line 59-Column 17, line 41) wherein the binding site modifications provide the means for directing and controlling binding interactions (Column 2, lines 50-57). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the binding analysis of Reed et al by modifying the binding site to contain cysteine residues and labels to thereby direct, control and detect binding interactions as taught by Hoffman et al (Column 2, lines 50-57).

9. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Reed et al (U.S. Patent No. 6,492,143, filed 17 December 1998) Gold et al (U.S. Patent No. 6,242,246, filed 15 December 1997).

Regarding Claim 27, Reed et al disclose a detector array comprising one or more groups of broad specificity biological sensing elements and variants thereof discretely immobilized onto a solid support ("arrayed in microtiter plates", Column 34, lines 62-65) wherein the sensing element is a polypeptide fragment comprising a ligand binding site (Column 33, lines 27) wherein the sensing elements have attached thereto a detectable label (e.g. rhodopsin-tagged protein, Column 33, lines 4-48 and Column 16, lines 16-54) and (Column 32, line 50-Column 34, line 3) but they do not teach the label is a fluorescent probe selected from the claimed

group. However, Gold et al teach a similar method comprising one or more groups of broad specificity biological sensing elements and variants thereof (Column 2, lines 27-37) discretely immobilized onto a solid support wherein the sensing elements have attached thereto a detectable label (Column 13, lines 37-59 and fig. 5) wherein the label is a fluorescent probe selected from the claimed group (Column 15, line 44-Column 16, line 45) and wherein the fluorescent probe provides for binding analysis in a position-specific and dynamic manner (Column 15, lines 60-65). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the fluorescent probes of Gold et al to the labeled sensing elements of Reed et al for the expected benefit of obtaining binding analysis in a position-specific and dynamic manner as taught by Gold et al (Column 15, lines 60-65).

Response to Arguments

10. Applicant argues the instant invention is drawn to an array i.e. "an orderly arrangement of items" as defined by a website dictionary. Applicant asserts this element is not taught by Reed. The argument has been considered but is not found persuasive. Even if the claimed array is interpreted according to provided definition, Reed specifically teaches their cell within a multi-well plate which clearly meets this definition of "orderly arrangement"("arrayed in microtiter plates", Column 34, lines 62-65). Hence, Reed teaches an array as defined by Applicant's definition. However, the cited definition is not a definitive definition for the claimed array because there are numerous varying definitions of the term. For example, the definition provided further defines an array as "an impressively large number". Additionally, Webster's Ninth New Collegiate Dictionary, defines array as "a regular and imposing grouping or arrangement"....."a group of elements forming a complete unit" (page 104). Hence, the claimed array is defined broadly to encompass any arrangement or grouping of elements. Reed clearly teaches the array.

Applicant argues that Reed does not teach an arrangement of cells or receptors within groups. Applicant further asserts that such an arrangement would not function in the method

of Reed. The claims are drawn to an array comprising one or more groups of broad specificity biological sensing elements and variants thereof. The claims are silent regarding any specific arrangement of the groups. It is noted that the specification (page 16, lines 8-10) suggest a preferred arrangement i.e. "The biological sensing elements for use in the detector array of the present invention are arranged in groups, each group comprising a sensing element and at least one variant thereof." However, the claims are not so limited as to define an arrayed arrangement comprising groups wherein each group has a sensing element and its variant. If this is Applicant's invention, it is suggested that such language be incorporated into the claims.

Applicant asserts that it is most likely the cells are not immobilized by Reed because the cells are within a flow chamber and because no means for immobilization are taught. Applicant suggests that it is most likely the cells are within the flow of liquid and not immobilized as claimed. The argument has been considered but is not found persuasive because, as cited above, Reed teaches the cells "arrayed in microtiter plates"(Column 34, lines 62-65) which clearly contain or hold (and hence immobilize) the cells within the wells.

Applicant asserts that the claims require the sensing element (and variant) itself is discretely immobilized and not contained within another receptacle which is immobilized. Applicant further asserts the instant specification supports this interpretation. Applicant's assertions are acknowledged. It is noted that Applicant has not pointed to a definitive teaching of the required immobilization. However, the specification does provide various means of sensing element (polypeptide) immobilization (pages 28-30).

> "Typically, the sensing elements are tagged for purification and/or immobilization. Tagging must not eliminate the binding activity of the polypeptide. Exemplary tagging systems include the hexahistidine or glutathione-s-transferase tag, as are well known in the art and described herein. Once linked to such an affinity tags the sensing element can be easily immobilized onto or within a solid matrix via the affinity tag and its ligand (for example Ni-NTA or glutathione). The sensing elements may be tagged at the N-terminus, C-terminus or even both or other locations within the

polypeptide chain so long as the tagging does not eliminate the binding activity of the sensing element."

While the specification supports polypeptide immobilization onto or within the support, wherein the immobilization is direct or through a linker, the claims are not so limited.

Applicant asserts the claims require specific elements not claimed e.g. arrangement of groups, said arranged groups consisting of a sensing element and at least one variant thereof, and direct immobilization of the sensing element removed from the cellular environment.

It is suggested that the claims be amended to define the invention as interpreted by Applicant.

Conclusion

11. No claim is allowed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (571) 272-0745. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
December 17, 2004